System Board D2119 for RX300 S3

Technical Manual

Edition May 2006

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1 Introduction

This technical manual describes the system board D2119, which can be equipped with one or two Intel® processors.

Further information about drivers is provided in the readme files on the hard disk, on the supplied "ServerSupport" or "ServerStart" CDs.

You will find further information in the BIOS description.

Notational conventions

The meanings of the symbols and fonts used in this manual are as follows:

italics	indicates commands, menu items, file and path names or software programs
`fixed font`	indicate system output on the monitor
`semi-bold fixed font`	indicates values to be entered through the keyboard
Key symbol	indicates keys according to their representation on the keyboard If capital letters are to be entered explicitly, then the Shift key is shown, e.g. SHIFT - A for A. If two keys need to be pressed at the same time, then this is shown by placing a hyphen between the two key symbols.
“quotation marks”	indicates names and terms that are being emphasized.
►	indicates an operation that to be performed
CAUTION!	indicates warnings, which, if ignored, will endanger your health, destroy the system or lead to the loss of data.
	indicates additional information, notes and tips

Table 1: Notational conventions

2 Important notes

In this chapter you will find essential information regarding safety when working with your server.

CAUTION!

With the system board installed you must open the system to access the system board. How to access the system board of your system is described in the appropriate service supplement.

When handling the system board, refer to the specific notes on safety in the operating manual and/or service supplement for the respective server.

2.1 Notes on safety

CAUTION!

- The actions described in these instructions should only be performed by authorized, qualified personnel. Equipment repairs should only be performed by qualified staff. Any failure to observe the guidelines in this manual, and any unauthorized openings and improper repairs could expose the user to risks (electric shock, fire hazards) and could also damage the equipment. Please note that any unauthorized openings of the device will result in the invalidation of the warranty and exclusion from all liability.
- Transport the device only in the antistatic original packaging or in packaging that protects it from knocks and jolts.
- Only install expansions that are allowed for the system board. If you install other expansions, you may damage the requirements and rules governing safety and electromagnetic compatibility or your system. Information on which system expansions are suitable can be obtained from the customer service centre or your sales outlet.
- The warranty expires if the device is damaged during the installation or replacement of system expansions.

- Components can become very hot during operation. Ensure you do not touch components when making extensions to the system board. There is a danger of burns!.
- Transmisson lines to peripheral devices must be adequately shielded.
- To the LAN wiring the requirements apply in accordance with the standards EN 50173 and EN 50174-1/2. As minimum requirement the use of a protected LAN line of category 5 for 10/100 MBps Ethernet, and/or of category 5e for Gigabit Ethernet is considered. The requirements of the specification ISO/IEC 11801 are to be considered.
- Never connect or disconnect data transmission lines during a storm (lightning hazard).

Batteries

CAUTION!

- Incorrect replacement of lithium battery may lead to a risk of explosion. The batteries may only be replaced with identical batteries or with a type recommended by the manufacturer.

  It is essential to observe the instructions in chapter “Replacing the lithium battery”.

Modules with electrostatic-sensitive components

Systems and components that might be damaged by electrostatic discharge (ESD) are marked with the following label:

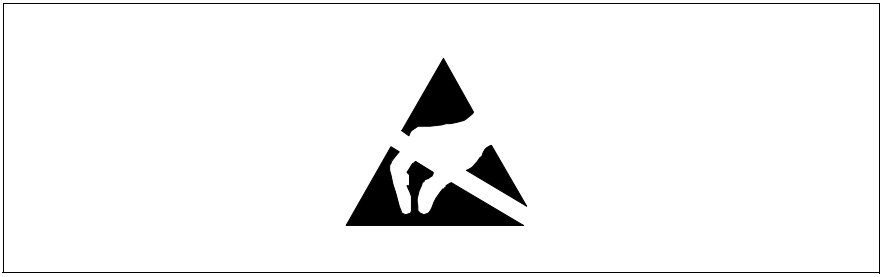


Figure 1: ESD label

When you handle components fitted with ESDs, you must observe the following points under all circumstances:

- You must always discharge yourself of static charges (e.g. by touching a grounded object) before working.
- The equipment and tools you use must be free of static charges.
- Remove the power plug from the power socket before inserting or removing boards containing ESDs.
- Always hold boards with ESDs by their edges.
- Never touch pins or conductors on boards fitted with ESDs.
- Use a grounding cable designed for this purpose to connect yourself to the system unit as you install/deinstall the board.
- Place all components on a static-safe base.

i You will find a detailed description for handling ESD components in the relevant European or international standards (EN 61340-5-1, ANSI/ESD S20.20).

Notes about boards

- During installation/deinstallation of the system board, observe the specific instructions described in the service manual for the server.
- Remove the plug from the mains outlet so that system and system board are totally disconnected from the mains voltage.
- To prevent damage to the system board, the components and conductors on it, please take great care when you insert or remove boards. Take great care to ensure that extension boards are slotted in straight, without damaging components or conductors on the system board, or any other components, for example EMI spring contacts
- Be careful with the locking mechanisms (catches, centring pins etc.) when you replace the system board or components on it, for example memory modules or processors.
- Never use sharp objects (screwdrivers) for leverage.

2.2 CE Certificate

CE

The shipped version of this board complies with the requirements of the EEC directive 89/336/EEC "Electromagnetic compatibility".

Compliance was tested in a typical PRIMERGY configuration.

2.3 Environmental Protection

Environmentally friendly product design and development

This product has been designed in accordance with standards for ”environmentally friendly product design and development“. This means that the designers have taken into account important criteria such as durability, selection of materials and coding, emissions, packaging, the ease with which the product can be dismantled and the extent to which it can be recycled.

This saves resources and thus reduces the harm done to the environment.

Notes on saving energy

Devices that do not have to be on permanently should not be switched on until they need to be used and should be switched off during long breaks and on completion of work.

Notes on packaging

Please do not throw away the packaging. We recommend that you do not throw away the original packaging in case you need it later for transporting.

Notes on dealing with consumables

Please dispose batteries in accordance with local government regulations.

Do not throw batteries and accumulators into the household waste. They must be disposed of in accordance with local regulations concerning special waste.

All batteries containing pollutants are marked with a symbol (a crossed-out rubbish bin on wheels). In addition, the marking is provided with the chemical symbol of the heavy metal decisive for the classification as a pollutant:

Cd Cadmium
Hg Mercury
Pb Lead

Notes on labeling plastic housing parts

Please avoid attaching your own labels to plastic housing parts wherever possible, since this makes it difficult to recycle them.

Returning, recycling and disposal

The device may not be disposed of with household rubbish. This appliance is labelled in accordance with European Directive 2002/96/EC concerning used electrical and electronic appliances (waste electrical and electronic equipment - WEEE).
The guideline determines the framework for the return and recycling of used appliances as applicable throughout the EU. To return your used device, please use the return and collection systems available to you. You will find further information on this at *www.fujitsu-siemens.com/recycling*.

For details on returning and reuse of devices and consumables within Europe, refer to the “Returning used devices” manual, or contact your Fujitsu Siemens Computers branch office/subsidiary or our recycling centre in Paderborn:

Fujitsu Siemens Computers
Recycling Center
D-33106 Paderborn

Tel. +49 5251 8 18010

Fax +49 5251 8 18015

3 Features

3.1 Overview

Processors

- 1 or 2 x Intel® Xeon™ dual core processors
- 2 processor sockets LGA771 for Intel® Xeon™ processor
- 2x2 or 4 MB second level cache (on-die unified, 64 byte cache-line size)
- 24 KB L1 cache (on-die, data)
- 16 KB L1 cache (on-die, instruction)
- 2xVRM 11.0 onboard (EVRD)

Main memory

- 8 slots for main memory FBD533/PC2-4200F or FBD667/PC2-5300 Fully Buffered DIMM memory modules with 512 MB, 1 Gbyte, 2 Gbyte and 4 Gbyte
- maximum 32 Gbyte of memory
- minimum 1 Gbyte (2 memory modules)
- maximum 32 Gbyte/s bandwidth
- supports 4 way interleaved memory subsystems (4 identical memory modules have to installed at the same time)
- ECC multiple bit error detection and single bit error correction
- memory scrubbing function
- Single Device Data Correction (SDDC) function (Chipkill™)
- Hot-spare memory support

Chips on the system board

- Intel® Blackford Chipset
- Dual-channel Broadcom LAN controller (BCM5715)
- LSI 8-channel SAS controller (LSI SAS1068)
- Flash for SAS-BIOS and NVRAM for integrated mirroring
- Flash and NVRAM for RAID
- Integrated VGA controller with PCI 32 Bit/33 MHz
- Super I/O controller (SMSC DME1737)
- Flash EPROM for:
  - SCSI-BIOS
  - BIOS
  - LAN

  - server management (SM)
- server management with iRMC (FSC System)
- thermal and system management controller (ADT7462)

Internal connectors

- floppy disk connector (fine print 26 pin)
- 1 IDE primary
- 2 Serial ATA
- combined connector for 6 x SAS, SAS signaling, 2 x USB (for USB ports on front side), 1 x SMB
- 1 USB connector for USB streamer (optional)
- SCSI activity connector (HD LED)
- main power connector (12V, -12V, 5V, 3.3V and 5V auxiliary)
- combined connector for 12V power supply and PC98
- front panel
- 8 direct connectors for fans
- IPMB connector
- KVM power connector
- NMI header
- reset header
- hot-plug signaling connector
- 1 RAID key
- 1 DDRII connector (RAID DIMM)

External connectors

- 1 serial port (COM1)
- second serial port (COM2) (optional)
- 1 parallel port (optional)
- 2 PS/2 interfaces for keyboard and mouse
- 2 USB 2.0 ports with 480 Mbits/s (rear side)
- 1 VGA port
- 2 RJ45 LAN ports

PCI slots

- 2 x PCI-X
- 3 x PCI-Express
- 1 x riser extension

BIOS features

- Phoenix System-BIOS V 4.06
- Rompilot
- SMBIOS 2.31 (DMI)
- MultiProcessor Specification 1.4
- Server Hardware Design Guide 3.0
- WfM 2.0
- IPMI 1.5
- ACPI 2.0 support
- USB keyboard/mouse
- LSI SAS/RAID BIOS
- boot possible from:
  - 120 MB floppy disk drive
  - CD-ROM/DVD
  - Festplatte
  - LAN
- console redirection support
- OEM logo
- CPU, memory disable
- hotspare memory support

Environmental protection

battery in holder

Form factor

290 x 480 mm

3.2 Main memory

The system board supports up to 32 Gbyte main memory. 8 slots (4 memory banks with 2 modules) are available for the main memory. Each memory bank can be populated with two 512 Mbyte, 1 Gbyte, 2 Gbyte or 4 Gbyte FBD533/PC2-4200F or FBD667/PC2-5300 fully buffered DIMM memory modules.

A memory bank can be configured as hot spare bank (optional).

As in the basic configuration memory bank 1 is populated with 1 Gbyte, 2 Gbyte, 4 Gbyte or 8 Gbyte memory modules, the memory extensions can be performed up to three times for memory bank 2, 3 and 4.

ECC with memory scrubbing and with the Single Device Data Correction (SDDC) function is supported.

Module population

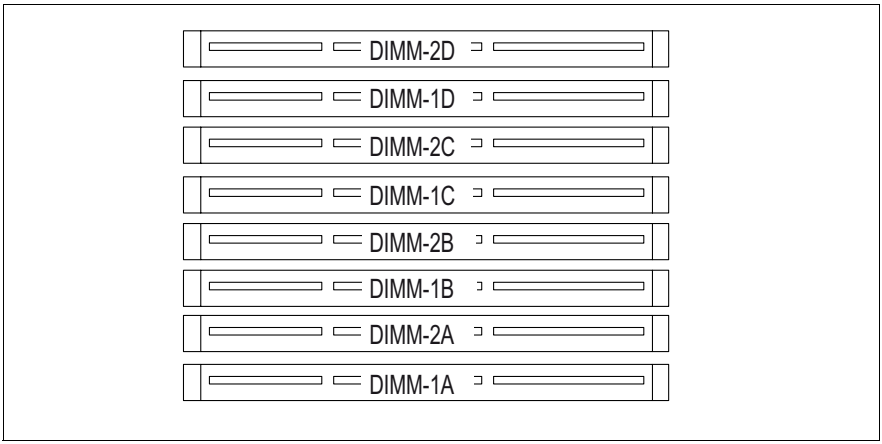


Figure 2: Main memory

– The memory modules have to be based on FBD533/PC2-4200F or FBD667/PC2-5300 fully buffered DIMM modules and must be populated in pairs.

– Each pair must consist of identical memory modules (2 way interleaved mode).

– The module capacity between pairs can differ: pair 1A/1B can be populated with two 512 Mbyte modules and pair 2A/2B with two 1 Gbyte modules.

Following table shows the mandatory population order:

module pair 1A/1B	**module pair 1C/1D**	**module pair 2A/2B**	**module pair 2C/2D**
populated	empty	empty	empty
populated	populated	empty	empty
populated	populated	populated	empty
populated	populated	populated	populated

Memory Mirroring

Memory Mirroring needs 4 or 4+4 identical memory modules:

Memory bank	**1**		**1**		**2**		**2**	
Channel (module)	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**
Population	4 identical memory modules				-		-	
	4 identical memory modules				4 identical memory modules			

3.3 PCI bus

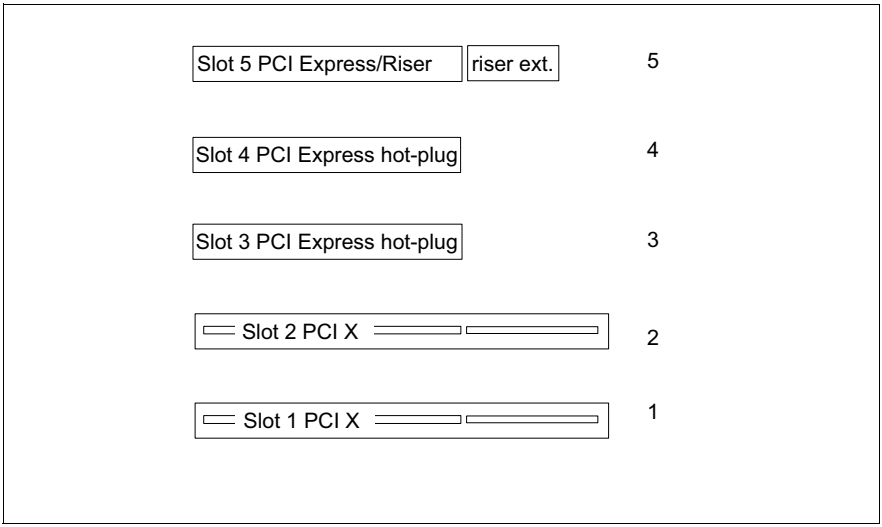


Figure 3: PCI slots

PCI slots

The following table shows an overview of the PCI slots:

PCI slot	64bit/ 32bit	Frequency in MHz	Description
1	64 bit	133	64-bit PCI-X slot
2	64 bit	133	64-bit PCI-X slot
3			PCI-Express x8 slot, hot-plug capable
4			PCI-Express x8 slot, hot-plug capable
5			PCI-Express x8 slot; prepared for riser card

Hot-plug PCI

PCI slots 3 and 4 are hot-plug capable.

Optional riser card

PCI slots 5 is prepared for an extension by a riser card with 3 x 64-bit slots.

3.3.1 ISA bus resources

Device	**IRQ**	**Address**	**DMA**
Timer	0	040-043	
Keyboard	1	060,064	
Serial port COM2	3	3F8-3FF, **2F8-2FF**, 3E8-3EF, 2E8-2EF	
Serial port COM1	4	**3F8-3FF**, 2FB-2FF, 3E8-3EF, 2E8-2EF	
free	5		
Floppy disk drive controller	6	3F0-3F5, 3F7	2
Parallel interface LPT1	7	278-27B, 378-37B, 3BC-3BF	0, 1, 3
Real-time clock (RTC)	8	070-071	
free	9, 10, 11		
Mouse controller	12		
Numeric processor	13	0F0-0FE	
IDE controller (primary)	14	1F0-1F7, 3F6	

"IRQ" = interrupt assigned as shipped
"Address" = this address can be used for your particular device
"Address" = this DMA can be used for your particular device
Default settings are shown in bold print

3.3.2 PCI resources

PCI IRQ Line x - Assignment of the PCI interrupts

PCI IRQ Line x defines which ISA interrupts are used for the separate PCI slots.

If you select Auto in the BIOS setup, the interrupts are assigned automatically and no further settings are required.

Multifunctional PCI boards or boards with an integrated PCI-to-PCI bridge can use several PCI interrupts (INTA#, INTB#, INTC#, INTD#). Monofunctional PCI boards (default) only use one PCI interrupt (INTA#) per PCI slot.

The PCI interrupts INTA#, INTB#, INTC# and INTD# are available for each PCI slot.

The same interrupt can be assigned simultaneously to several PCI boards. You should avoid this condition due to reduced performance.

If you use a setting other than Auto, the Plug&Play functionality of the system BIOS for the corresponding PCI boards is deactivated.

Auto The PCI interrupts are assigned automatically in accordance with the Plug&Play guidelines.

Disabled No ISA interrupt is assigned to the PCI interrupt.

3, 4, 5, 6, 7, 9, 10, 11, 12, 14, 15

The selected ISA interrupt is assigned to the PCI interrupt. You may not select an ISA interrupt that is used by a component on the system board (e.g. controller) or an ISA board.

	A	B	C	D
Slot 1	PCI IRQ line 1	PCI IRQ line 2	PCI IRQ line 3	PCI IRQ line 4
Slot 2	PCI IRQ line 3	PCI IRQ line 4	PCI IRQ line 1	PCI IRQ line 2
Slot 3	PCI IRQ line 2	PCI IRQ line 3	PCI IRQ line 4	PCI IRQ line 1
Slot 4	PCI IRQ line 1	PCI IRQ line 2	PCI IRQ line 3	PCI IRQ line 4
Slot 5	PCI IRQ line 1	PCI IRQ line 2	PCI IRQ line 3	PCI IRQ line 4
VGA	PCI IRQ line 6	-	-	-
SAS	PCI IRQ line 1	-	-	-
LAN	PCI IRQ line 1	PCI IRQ line 2	-	-
USB	PCI IRQ line 8	PCI IRQ line 7	PCI IRQ line 6	PCI IRQ line 5
RAID	PCI IRQ line 3	-	-	-

A..D: Interrupt output of the PCI controller

3.4 Screen resolution

Depending on the operating system used the screen resolutions in the following table refer to the screen controller on the system board. If you are using an external screen controller, you will find details of supported screen resolutions in the operating manual or technical manual supplied with the controller.

Screen resolution	Supported colours
640x480	8 bit, 16 bit, 24 bit
800x600	16 bit, 24 bit
1024x768	16 bit
1152x864	8 bit
1280x1024	8 bit

3.5 Temperature / system monitoring

Temperature and system monitoring aim to reliably protect the computer hardware against damage caused by overheating. In addition, any unnecessary noise is also prevented by reducing the fan speed, and information is provided about the system status.

The following functions are supported:

Temperature monitoring

Measurement of the processor and the system internal temperature by an onboard temperature sensor, measurement of the ambient temperature by a I^2C temperature sensor.

Fan monitoring

The CPU, power supply unit and system fans are monitored. Fans that are no longer available, blocked or sticky fans are detected.

Fan control

The fans are regulated according to temperature.

Sensor monitoring

The removal of, or a fault in, a temperature sensor is detected. Should this happen all fans monitored by this sensor run at maximum speed, to achieve the greatest possible protection of the hardware.

Voltage monitoring

When voltage exceeds warning level high or falls below warning level low an alert will be generated

System Event Log (SEL)

All monitored events of the system board are signalised via the Global Error LED and recorded in the System Event Log. They could be retrieved in the BIOS Setup or via ServerView.

PRIMERGY Diagnostic LEDs

Optical signaling through the LEDs on the systemboard identifies defective modules and components as well as gaining information on the PDA.

3.6 LEDs

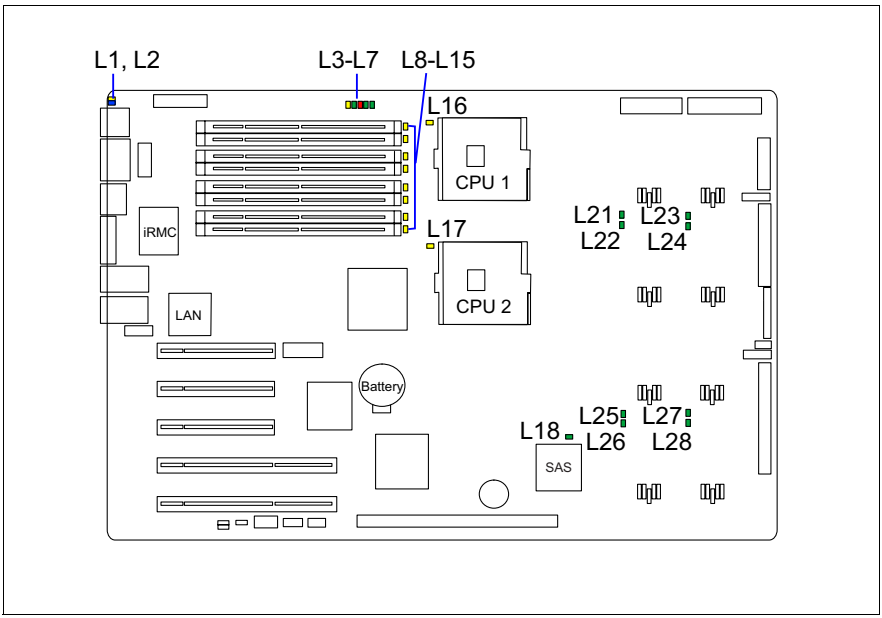


Figure 4: LEDs

L1 and L2 are visible from outside on the rear of the server. All the other LEDs are only visible, if the cover of the server is open.

The LEDs have the following meaning:

LED	Indicator	Meaning
L1 - Status (Global Error)	orange	indicates a prefailure
	orange flashing	indicates a failure. Reasons for a failure may be: - overheating of one of the sensors - sensor defect - fan defect - CPU error - Software detected an error
L2 - ID	blue	server is identified via ServerView
L3 - board	orange	aux. voltage available
L4 - board	green	system running
L5 - board	red	configuration error. The system board will be held in reset. Possible configuration errors are e.g.: old CPU populated, CPUs with different FSB requirements populated, CPU1 not populated
L6 - board	green flashing	iRMC - server management controller is ok
	off	iRMC not alive
L7 - board	orange	RAID cache dirty
L8 - L15 memory banks	orange flashing	indicates an error in the corrensponding memory module
L8		memory bank 4, module DIMM-2D
L9		memory bank 2, module DIMM-1D
L10		memory bank 4, module DIMM-2C
L11		memory bank 2, module DIMM-1C
L12		memory bank 3, module DIMM-2B
L13		memory bank 1, module DIMM-1B
L14		memory bank 3, module DIMM-2A
L15		memory bank 1, module DIMM-1A
L16 - CPU	orange flashing	error in CPU1

LED	**Indicator**	**Meaning**
L17 - CPU	orange flashing	error in CPU2
L18 - SAS	green flashing	SAS controller active
L21 - L28 fans	green	fan is running
	orange	indicates a prefailure
	orange flashing	indicates a failure
L21		CPU fan 1
L22		CPU fan 2
L23		CPU fan 4
L24		CPU fan 5
L25		CPU fan 3
L26		system fan 1
L27		CPU fan 6
L28		system fan 2

3.7 Interfaces and connectors

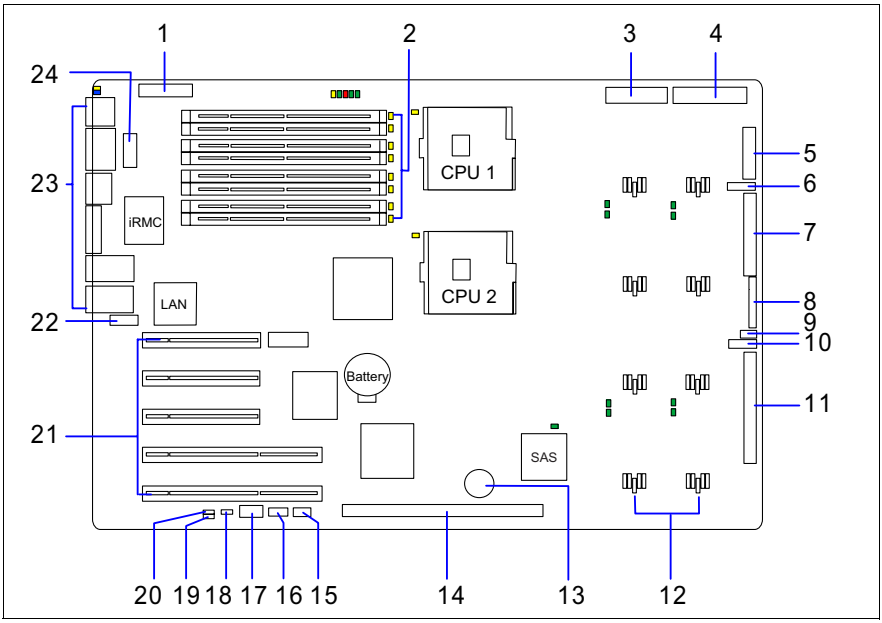


Figure 5: Schematic view of the system board D2119

1 = Parallel port (optional)
2 = Slots for main memory modules
3 = Stromversorgung 12V + PC98
4 = Main power
5 = Front panel
6 = SATA1
7 = IDE primary
8 = Floppy disk drive
9 = USB7
10 = SATA3
11 = SAS1-6 + USB3-4 + SMB2
12 = CPU and system fans
13 = RAID key
14 = RAID DIMM
15 = KVM power
16 = IPMB
17 = DIP switch (see page 29)
18 = HD LED
19 = NMI
20 = Reset
21 = PCI slots
22 = Hot-plug signaling
23 = External ports
24 = Serial port COM2 (optional)

3.7.1 External ports

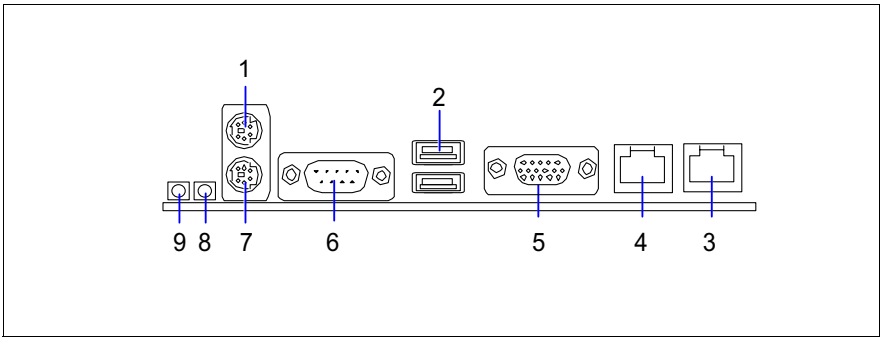


Figure 6: External ports of the system board D2119

1 = PS/2 mouse connector
2 = USB ports 1 and 2
3 = LAN2 connector
4 = LAN1 connector
5 = VGA port
6 = serial interface COM1
7 = PS/2 keyboard connector
8 = ID LED
9 = Global Error LED

The serial interface COM1 can be used as default interface or to communicate with the iRMC.

LAN connectors

On this system board you will find a dual-channel Broadcom LAN controller (BCM5715).

The LAN controller supports the transfer rates of 10 Mbit/s, 100 Mbit/s and 1 Gbit/s.

The LAN controller supports WOL function through Magic Packet™.

It is also possible to boot a device without its own boot hard disk via LAN. Here Intel PXE is supported.

The LAN1 port serves as management interface and is prepared for RemoteView.

The LAN connectors are equipped each with two LEDs (light emitting diode) indicating the transfer rate and the activity.

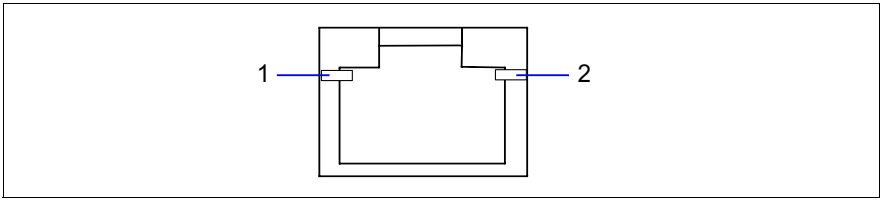


Figure 7: LAN connector

1	LAN transfer rate	green + yellow	off	transfer rate 10 Mbit/s (or no connection)
		green	on	transfer rate 100 Mbit/s
		yellow	on	transfer rate 1000 Mbit/s
2	LAN link/aktivity	green	on	LAN connection
			off	no LAN connection
			flashing	LAN transfer

3.8 Settings with switches

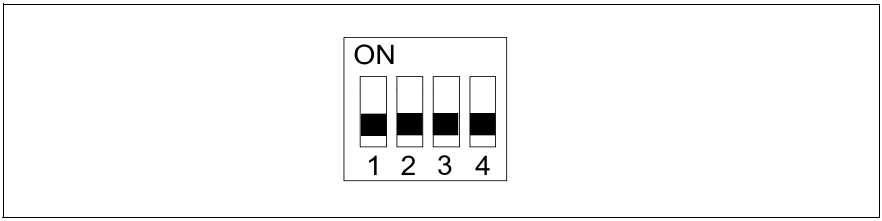


Figure 8: DIP switch

Preset for switches 1 to 4 = *Off*.

Recovering System BIOS - switch 1

Switch 1 enables recovery of the old system BIOS after an attempt to update has failed. To restore the old system BIOS you need a Flash BIOS Diskette (please call our customer service centre).

on The system boots from the "Flash BIOS floppy disk" from Drive A and reprograms the system BIOS on the board.

off The System BIOS is started with the system BIOS from the system board (default setting).

Skipping the password query - switch 2

Switch 2 is used to define whether the password is queried at system startup, if the password protection is enabled in BIOS Setup (in *Security* menu, the *Password* field must be set to *Enabled*).

on The password query is skipped. Passwords are deleted.

off The password query is effective (default setting).

Write protection for Flash BIOS - switch 3

Switch 3 is used to define whether the System BIOS is write protected or not.

on The System BIOS can neither be written to nor deleted. Flash-BIOS update from floppy disk is not possible.

off The System BIOS can be written or deleted. Flash-BIOS update from floppy disk is possible (default setting)

Write protection for floppy disks - switch 4

Switch 4 is used to define whether floppy disks can be written or deleted in the floppy disk drive. To write and delete floppy disks, the write-protection in BIOS Setup must be disabled (in menu *Security*, the field *Diskette Write* must be set to *Enabled*).

on The floppy disk drive is write-protected.

off Floppy disks can be read, written and deleted (default setting).

4 SAS and RAID

4.1 SAS/IME configuration program

The system board is equipped with an eight channel SAS controller 1068 from LSI Logic.

You will find the exact location of the SAS connector in the schematic view of the system board.

The BIOS of the onboard SAS controller includes a menu-driven SAS/IME (Integrated Mirror Enhanced) configuration program. This program allows you to change almost all of the option settings of the SAS controller.

When you boot the system a SAS-BIOS message listing the SAS devices connected is displayed.

If a SAS-BIOS error message appears or problems arise with SAS devices, please read the documentation of your SAS device.

If you are unable to trace or rectify the error, please contact your dealer or our customer service centre.

Working with the keyboard

Use the following keys when running the program:

arrow keys	to make selections
[+]/[-]	to change a selection
[ENTER]	to accept a selection
[ESC]	to call the previous menu and to terminate the SAS configuration program
[F2]	to jump into the menu line. This function is not available in all menus

Calling the SAS/IME configuration program

- Start the PC, if the following message appears, press the key combination [CTRL] and [C]:

  „Press Ctrl-C to start LSI Logic Configuration Utility“

Following hint appears next:

„Please wait, invoking LSI Logic Configuration Utility...“

In the first menu all available SAS controllers are displayed.

```
LSI Logic MPT Setup Utility
Adapter List  Global Properties
_____________________________________________________________________________

Adapter    PCI  PCI  PCI  PCI   FW Revision       Status   Boot
           Bus  Dev  FNC  Slot                             Order
SAS1068    02   08   00   00    1.10.01.00-IR     Enabled  0




_____________________________________________________________________________
Esc = Exit Menu   F1/Shift+1 = Help
Alt+M = Global Properties  +/- = Alter Boot Order Ins/Del = Alter Boot List
```

Terminating the SAS/IME configuration program

Depending on the current menu level, you can display the previous menu by pressing the ESC key. If you have made changes in the current menu you will be prompted to store them.

- ► To quit the configuration program press the [ESC] key until a corresponding message is displayed.

Configuring IME

- ► To configure IME select your adapter in the menu by using the arrow keys. Press the [ENTER] key to change into the menu *Adapter Properties*.
- ► From there select the depending entry and press the [ENTER] key to change into the submenus.

Detailed instruction on the configuration of IME are contained in the IME User's Guide.

Menu Adapter Properties

```
LSI Logic MPT Setup Utility
Adapter Properties -- SAS1068
_____________________________________________________________________________

            Adapter Properties          SAS1068
            PCI Slot                    00
            PCI Address(Bus/dev/Func)   02:08:00
            MPT Firmware Revision       1.10.01.00-IR
            SAS Address                 5003005F:FFFFFFF0
            Status                      Enabled
            Boot Order                  0
            Boot Support                [ Enabled BIOS & OS ]



            RAID Properties

            SAS Topology

            Advanced Adapter Properties




_____________________________________________________________________________
Esc = Exit Menu          F1/Shift+1 = Help
Enter = Select Item      +/- = Change Item
```

Boot Support **Enabled BIOS & OS** (it is recommended: don't change this setting)
or
Enabled BIOS only

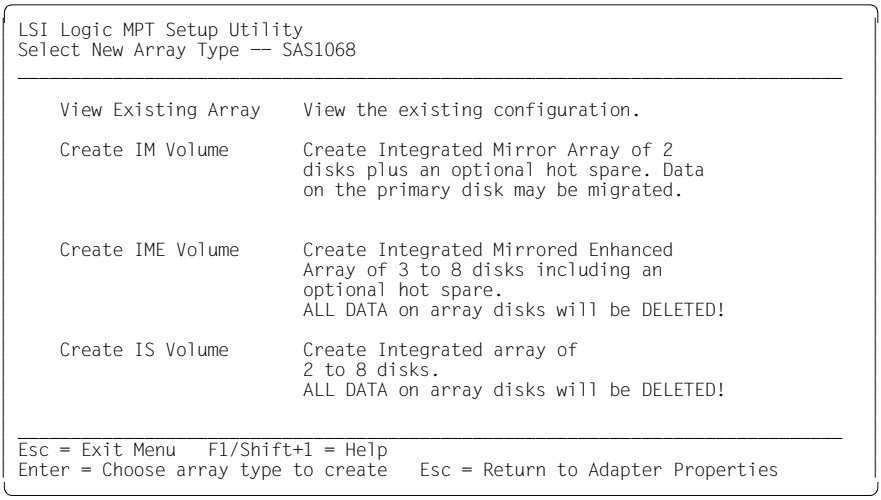
Menu **RAID Properties** see page 34.

Menu **SAS Topology** see page 36.

Menu **Advanced Adapter Properties** see page 37.

Menu RAID Properties

In this menu you can start the RAID configuration menu.


LSI Logic MPT Setup Utility
Select New Array Type -- SAS1068
View Existing Array
View the existing configuration.
Create IM Volume
Create Integrated Mirror Array of 2 disks plus an optional hot spare. Data on the primary disk may be migrated.
Create IME Volume
Create Integrated Mirrored Enhanced Array of 3 to 8 disks including an optional hot spare.
ALL DATA on array disks will be DELETED!
Create IS Volume
Create Integrated array of 2 to 8 disks.
ALL DATA on array disks will be DELETED!
Esc = Exit Menu F1/Shift+1 = Help
Enter = Choose array type to create Esc = Return to Adapter Properties

Menu View Existing Array

View Array displays the status of the configured hard disks.

```
LSI Logic MPT Setup Utility
View Array -- SAS1068
_____________________________________________________________________________

    Array           1 of 1
    Identifier      LSILOGICLogical Volume 3000
    Type            IM
    Scan Order      4
    Size(MB)        34332
    Status          Optimal

    Manage Array

Slot Device Identifier          RAID  Hot    Drive       Pred    Size
Num                             Disk  Spr    Status      Fail    (MB)
  4  SEAGATE ST373454SS   1501  Yes   No     Primary     No      34332
  5  SEAGATE ST3146854SS  1501  Yes   No     Secondary   No      34332




_____________________________________________________________________________
Esc = Exit Menu   F1/Shift+1 = Help
Enter = Select Item   Alt+N = Next Array   C = Create an array
```

Only two RAIDs can be configured on the SAS-Controller 1068.

The administration of the RAID system can be set later by a tool in your operating system (see therefore the documentation „Global Array Manager“).

Menu SAS Topology

SAS Topology displays the allocations of the hard disks.

```
LSI Logic MPT Setup Utility
SAS Topology -- SAS1068
_____________________________________________________________________________
                    Device Identifier                              Device
SAS1068(02:08:00)                                                  Info
I_  Enclosure       Direct Attach Devices                          Controller
    I_ Bay 0        SEAGATE ST3146854SS         1501               SAS
    I_ Bay 1        SEAGATE ST336754SS          1501               SAS
    I_ Bay 2        SEAGATE ST336754SS          1501               SAS
    I_ Bay 4        RAID Physical Disk                             SAS
    I_ Bay 5        RAID Physical Disk                             SAS
I_  IM VOL          LSILOGICLogical Volume      3000
    I_              SEAGATE ST373454SS          1501
    I_              SEAGATE ST3146854SS         1501
_____________________________________________________________________________
Esc = Exit   F1 = Help
Alt+D = Device Properties   Alt+M = More Keys
```

Menu Advanced Adapter Properties

```
LSI Logic MPT Setup Utility
Advanced Adapter Properties -- SAS1068
_____________________________________________________________________________

       IRQ                    0B
       NUM                    Yes
       IO Port Address        3000
       Chip Revision ID       01


       CHS Mapping            [SCSI Plug and Play Mapping]


       Advanced Device Properties
       Spinup Properties
       PHY Properties
       Restore Defaults




_____________________________________________________________________________
Esc = Exit Menu   F1/Shift+1 = Help
Enter = Select Item   -/+ = Change Item
```

CHS Mapping **SCSI Plug and Play Mapping** (it is recommended: don't change this setting)
or
Alternate CHS Mapping

Menu **Advanced Device Properties** see page 38.

Menu **Spinup Properties** see page 39.

Menu **PHY Properties** see page 40.

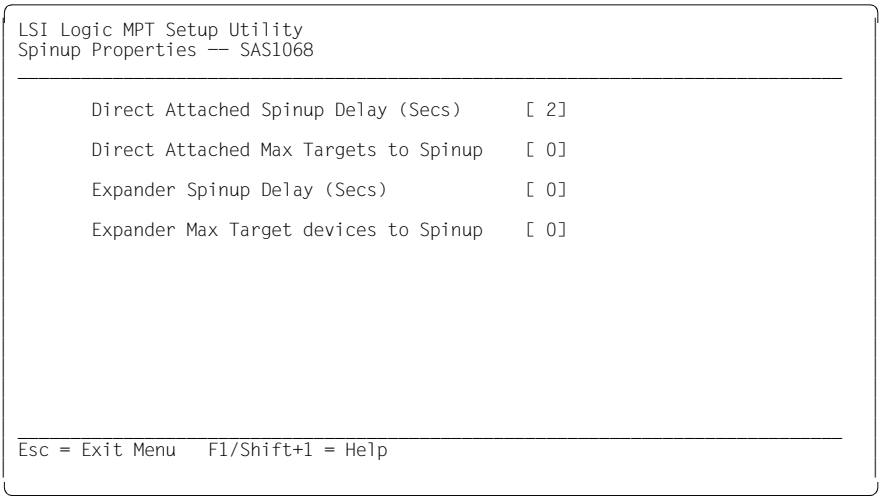
Menu Advanced Device Properties

It is recommended: don't change this setting.

```
LSI Logic MPT Setup Utility
Advanced Device Properties -- SAS1068
_____________________________________________________________________________

       Maximum INT 13 devices for this adapter   24

       IO Timeout for Block Devices              10
       IO Timeout for Block Devices(Removable)   10
       IO Timeout for Sequential Devices         10
       IO Timeout for Other Devices              10

       LUNs to Scan for Block Devices            [All]
       LUNs to Scan for Block Devices(Removable) [All]
       LUNs to Scan for Sequential Devices       [All]
       LUNs to Scan for Other Devices            [All]

       Removable Media support                   [None]

       Restore Defaults

_____________________________________________________________________________
Esc = Exit Menu   F1/Shift+1 = Help
Enter = Select Item   -/+ = Change Item
```

Menu Spinup Properties

It is recommended: don't change this setting.


LSI Logic MPT Setup Utility
Spinup Properties -- SAS1068
Direct Attached Spinup Delay (Secs) [2]
Direct Attached Max Targets to Spinup [0]
Expander Spinup Delay (Secs) [0]
Expander Max Target devices to Spinup [0]
Esc = Exit Menu F1/Shift+1 = Help

Spinup Delay Defines the intervals for the spinup of the hard disks.

The default setting is 2.

When this feature is enabled, the SAS devices which support this function are not started by switching on the server until they receive a „Start Unit“ command from BIOS of the SAS controller.

This function is used to distribute the high starting currents of the SAS devices over a specific period and to release the power supply of your server.

Menu PHY Properties

It is recommended: don't change this setting.

```
LSI Logic MPT Setup Utility
PHY Properties -- SAS1068
_____________________________________________________________________________

       PHY                     0 (1st of 8 PHYs)
       SAS Port                0
       Link Status             Enabled, 3.0 Gbps
       Discovery Status        000000


       Device Identifier       SEAGATE ST3146854SS    1501
       Scan Order              0
       Device Information      SAS
       SAS Address             5000C500:0000EB39









_____________________________________________________________________________
Esc = Exit Menu   F1/Shift+1 = Help
Enter = Reset Phy error logs   Alt+N = Next Phy   Alt+P = Previous Phy
```

4.2 RAID on Motherboard (ROMB)

Components

On the system board a high-performance SAS RAID-Controller MegaRAID SAS PCI Express™ ROMB is implemented.

The RAID solution consists of the Intel IOP332 I/O processor with integrated PCI-E to PCI-X bridge and the LSI SAS chip 1068. In the system boards' basic configuration this RAID solution is not available. If you want to use this solution, you need the following additional components:

– iButton: contains a key for clearing

– cache module: either an iTBBU2 cache module with battery or a DDR2 400 MHz memory module

You must switch off the system before installing the new components. The iButton in installed in the socket named „RAID KEY“. The cache module is inserted in the socket named „RAID DIMM“.

You will find the exact location of the SAS connectors in the schematic view of the system board.

Through activating of this RAID implementation the onboard SAS chip is integrated into the RAID configuration.

The configurations described in the chapter „SAS/IME configuration program“ are then no longer available.

SAS connectors

The RAID implementation give the possibility to connect devices via the SAS chips of six SAS channels, channel 0 to channel 5. This channels are assigned to the SAS connector.

You will find the exact location of the SAS connector in the schematic view of the system board.

SAS/RAID configuration program WebBIOS

WebBIOS allows to modify or control the controller settings and the RAID configuration. *WebBIOS* is called by the key combination CONTROL h during the controller's POST. When the boot process has been finished, *WebBIOS* will be started. The controller selection is the start page, shown in figure 9. The further actions will be executed on the selected controller. You validate the controller with Start. Start calls the main menu, shown in figure 10. The main menu allows to get all information and settings which are offered by *WebBIOS*.

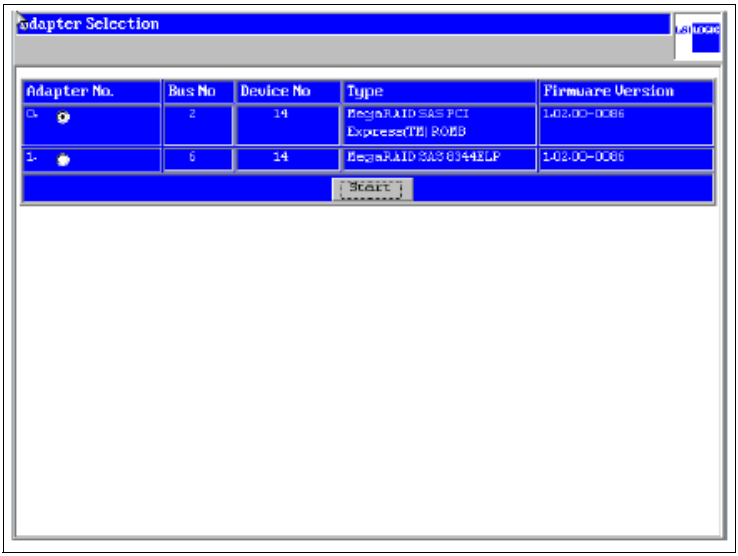


Figure 9: WebBIOS start page controller selection

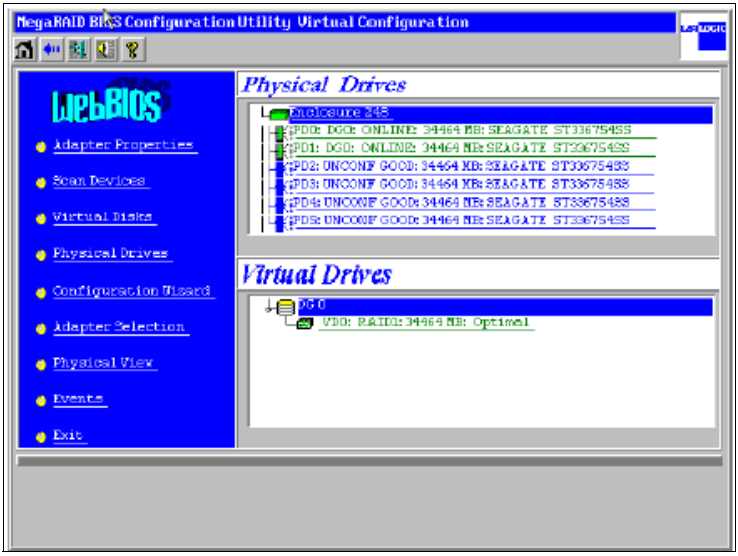


Figure 10: WebBIOS main menu

WebBIOS can be operated by mouse or keyboard. For operating by keyboard you can use the keys shown in the table above. A detailed description of the WebBIOS is contained in the „MegaRAID SAS Software User's Guide“.

TAB key	to select a menu item
ÊË	to modify an item
ENTER	to validate a selection
ÀÂ	to scroll right or left between a line

5 Replacing the lithium battery

In order to save the system information permanently, a lithium battery is installed to provide the CMOS-memory with a current. When the charge is too low or the battery is empty, a corresponding error message is provided. The lithium battery must then be replaced.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer (CR2450).

Do not throw lithium batteries into the trashcan. It must be disposed of in accordance with local regulations concerning special waste.

Make sure that you insert the battery the right way round. The plus pole must be on the top!

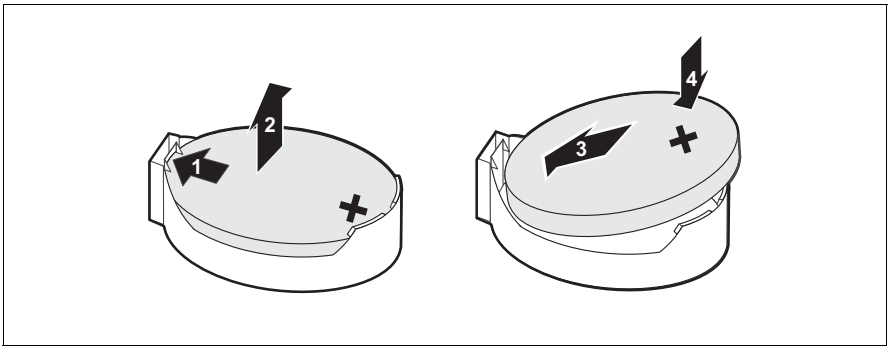


Figure 11: Replacing the lithium battery

- ► Press the locking spring into direction of of the arrow (1), so that the lithium battery jumps out of its socket.
- ► Remove the battery (2).
- ► Insert a new lithium battery of the same type into the socket (3) and (4).

Abbreviations

The technical terms and abbreviations given below represent only a selection of the full list of common technical terms and abbreviations.

Not all technical terms and abbreviations listed here are valid for the described system board.

ACPI
Advanced Configuration and Power management Interface

ASSR
Automatic Server Recovery and Restart

ATA
Advanced Technology Attachment

BBU
Battery Backup Unit

BIOS
Basic Input Output System

BMC
Baseboard Management Controller

CMOS
Complementary Metal Oxide Semiconductor

COM
COMmunication port

CPU
Central Processing Unit

DDR
Double Data Rate

DIMM
Dual In-line Memory Module

DIP
Dual In-line Package

DMI
Desktop Management Interface

DRAM
Dynamic Random Access Memory

ECC
Error Correction Code

EEPROM
Electrical Erasable Programmable Read Only Memory

EPROM
Erasable Programmable Read Only Memory

EMRL
Embedded RAID Logic

EVRD
Enterprise VRD

HPC
Hotplug Controller

ICE
In Circuit Emulation

IDE
Integrated (intelligent) Drive Electronics

IME
Integrated Mirror Enhanced

IOOP
Intelligent Organisation Of PCI

IPMB
Intelligent Platform Management Bus

IPMI
Intelligent Platform Management Interface

iRMC
integrated Remote Management Controller

LAN
Local Area Network

LED
Light Emitting Diode

MPS
Multi Processor Specification

NMI
Non Maskable Interrupt

OEM
Original Equipment Manufacturer

OHCI
Open Host Controller Interfache

OS
Operating System

PCI
Peripheral Components Interconnect

PDA
Prefailure Detection and Analyzing

PIO
Programmed Input Output

PLD
Programmable Logic Device

PS(U)
Power Supply (Unit)

PWM
Puls Wide Modulation

PXE
Preboot eXecution Environment

RAID
Redundant Array if Inexpensive Disks

RSB
Remote Service Board

RST
ReSeT

RTC
Real Time Clock

SAS
Serial Attached SCSI

SATA
Serial ATA

SCSI
Small Computer Systems Interfache

SDDC
Single Device Data Correction

SDRAM
Synchronous Dynamic Random Access Memory

SHDG
Server Hardware Design Guide

SMB
System Management Bus

SMM
Server Management Mode

SMP
Symmetrically Multi Processing

UHCI
Unified Host Controller Interface

USB
Universal Serial Bus

VGA
Video Graphics Adapter

VRD
Voltage Regulator Down

VRM
Voltage Regulator Module

WfM
Wired for Management

WOL
Wake up On LAN

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Comments
Suggestions
Corrections

Submitted by

Comments on System Board D2119
for RX300 S3

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